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DE 003124704 A DE 002026893 A JP 070184761 A
US 5100725 A

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(54) Abstract Title
Reflective thermal/vapour/acoustic underlay insulation barrier for floor coverings

(57) Thermal/acoustic/vapour insulation barriers for floor coverings such as wood, vinyl, cushion, carpets and rugs, tiles, ceramic tiles, flocked substrates or bricks incorporate a reflective surface that reflects more than 80% of total radiation that passes in and though a floor-covering to the area/ground or medium beneath it. The invention is particularly but not exclusively a foam (e.g. polyethylene or polypropylene or polyester), crumb or latex rubber, non-woven felt or woven or knitted substrate that has one or both sides covered with a reflective surface such as a metallised polyester or aluminium foil. A woven, knitted or non-woven backing may be present.

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Therma-Lay
Reflective Thermal Insulation Barrier and Static/ Anti-Static Dissipation/insulation Under-lay Materials for Floor Coverings

Patent Application

Description

The present invention relates to articles offering reflective thermally insulating properties, particularly but not exclusively, closed cell foams (such as polyethylene or crumb rubber, non-woven and felt substrates, that have one or both sides covered with a reflective surface, as well as for woven, knitted and non-woven substrates or a combination of each, consisting of yarns, filaments or fibres that are either polypropylene or a combination of fibres that may also have thermo-plastic properties, which are also covered or coated with a reflective surface to produce energy efficient articles for conserving warmth, that act as an insulation barrier to prevent heat energy escaping through a floor covering by radiation, conduction or convection.

These substrates can also be a combination of an open or a closed-cell foam or crumb-rubber, non-woven or felt underlay product that have on one side a woven or knitted or non-woven substrate that acts as a backing, a metallised polyester or aluminium foil is sandwiched or where the underlay or primary has been sprayed or coated with reflective metallised particles or paint or pigment.

The concept of the invention is to produce a reflective thermal insulation barrier in floor coverings and for use in conjunction with other flooring systems such as wood (parquet), vinyl, cushion, carpets and rugs (woven, tufted or non-woven), carpet tiles, ceramic tiles, flocked substrates or bricks, by incorporating a reflective surface that reflects ore than 80% of total radiation that passes in and through a floor-covering to the area/ground or medium beneath it. With this invention, it is possible to conserve heat energy within a room or area by creating this form of insulation barrier between the ground or area under the floor-covering, or substrate under the floor covering, and the air in the space above the floor covering, i.e. the room.

This reflective thermal insulation barrier can, in accordance with this invention, be a foam or crumb – rubber or non-woven felt, and has either one or both sides laminated or covered with a reflective surface that may be a metallised polyester or aluminium foil or that may have been sprayed/coated with a highly reflective paint or similar product offering high reflective properties. This underlay, therefore, offers substantial advantages in thermal insulation as the underlay acts as an insulation medium against convection and conduction, whilst the reflective surface also acts as a means of reflecting radiation back into the room, instead of the heat/radiation penetrating and being lost through the floor-covering and through the underlay.

The invention also refers to the underlay being coated/covered on both sides. This is in order that the cold and moisture from the ground or base material under the floor covering (e.g. concrete or bitumen) is reflected back into the ground to prevent the cold coming through the underlay and/or the floor-covering. The reflective surface, therefore, also acts as a moisture and vapour barrier.

Uses:
Aircraft, stadiums, cars, buses, houses, hotels, offices, hospitals.

Various types and thickness of primary-, secondary-backings and underlays for floor-coverings are used with emphasis and provide a cushion for the floor-covering to sit upon to help maintain its appearance and reduce wear. No primary-, secondary-backings or underlays address the problem of radiation passing through the floor covering and on through the underlay, by using a reflective medium/layer/coating to create a thermally efficient floor-covering.

Thermally insulating underlay for Floor-Coverings
Patent Application

CLAIMS

1. An article fabricated substantially of a sheet material with a second layer of either a metallised polyester film of aluminium foil surface laminated or bonded to it on one or both sides, where the combined material is used as an under floor thermal insulation layer.
2. An article as in Claim 1 but where the sheet material comprises of a polymer foam, either mono or co-polymer, or similar flexible material such a rubber or crumb rubber.
3. An article in any preceding Claim where the sheet material comprises of a non-woven or felt underlay product.
4. An article in any preceding Claim where the sheet material comprises of a polyester open or closed cell foam.
5. An article in any preceding Claim where the sheet material comprises of a polypropylene open or closed-cell foam.
6. An article in any preceding Claim but which supports one or more layers of a material.
7. An article in any preceding Claim comprising preferably of a cross-linked polyolefin with a density of between 25 and 150 kg/m^3 but preferably 50 kg/m^3, which has a metallised polyester film of aluminium foil surface laminated to it on one side.
8. An article as in any preceding Claim but where the polymer foam is embossed, in particular using a 'D-shaped' Pattern or inverse pyramid emboss or alternative design of emboss to artificially lower the compressive strength of the foam, thereby giving greater "softness."
9. An article as in any preceding Claim whereby a layer of air is trapped between the foil/metallised sheet material and the sheet material.
10. An article in any preceding Claim but with a woven or non-woven substrate or scrim is laminated either to the opposing side or on top of the metallised surface to aid adhesion and to reduce creep or movement of the insulating underlay article or reduce creep or movement of the floor covering supported on the invention.
11. An article in any preceding Claim but with a knitted substrate laminated either to the opposing side or on top of the metallised surface, to aid adhesion and to reduce creep or movement of the insulating underlay article or reduce creep or movement of the floor covering supported on the invention.
12. An article according to any preceding claim wherein said sheet material has a thickness of less than 10mm.

13. An article according to any preceding claim wherein said sheet material has a thickness that is greater than 0.5mm.
14. An article according to any preceding claim wherein said sheet material has a thickness of between 4.5mm and 7.5mm.
15. An article according to any preceding claim wherein said metallised polyester film of aluminium foil surface laminated to it is between 4 micron and 12 micron.
16. An article according to any preceding claim wherein said metallised polyester film of aluminium foil surface laminated to it is in particular 6 micron.
17. An article according to any preceding claim wherein said metallised polyester film or aluminium foil laminate is on either side of the said materials in any or all of the Claims numbered 1 to 5, so that the said material(s) is sandwiched between two reflective outer layers.
18. An article according to any preceding claim, wherein the outer material has been chemically treated to have anti-fungal and anti-mildew properties.
19. An article according to any preceding claim, which can be used as a thermal insulation medium or as a means of discharging electrostatic in rooms especially where computers are located.
20. An article according to any preceding claim, which can be used as a thermal insulation medium to reflect radiant heat back into the room rather than allow it to dissipate into the floor under the flooring system e.g. carpet or linoleum, or hard wood as well as provide insulation from conduction.
21. An article according to any preceding claim, which can be used as an anti-static insulation medium or as a means of discharging electrostatic in rooms especially where computers are located.
22. An article according to any preceding claim, whereby the secondary layer laminated to the sheet material is of a reflective nature or designed to reflect radiation.

Thermally Insulating Underlay for Floor-Coverings
Patent Application

Amendments to the claims have been filed as follows

1. An article fabricated substantially of a sheet material with a second layer of either a metallised polyester film of aluminium foil surface laminated or bonded to it on one or both sides, where the combined material is used as an under floor thermal insulation layer.
2. An article as in Claim 1, but where the sheet material comprises of a polymer foam, either mono or co-polymer or similar flexible material such as rubber, Latex or crumb rubber.
3. An article in any preceding Claim where the sheet material comprises of a non-woven or felt underlay product.
4. An article in any preceding Claim where the sheet material comprises of a polyester open or closed cell foam.
5. An article in any preceding Claim where the sheet material comprises of a polypropylene open or closed-cell foam.
6. An article in any preceding Claim, but which supports one or more layers of a material.
7. An article in any preceding Claim comprising preferably of a cross-linked polyolefin with a density of between 25 and 150 kg/m^3, but preferably 50 kg/m^3, which has a metallised polyester film of aluminium foil surface laminated to it on one side.
8. An article as in any preceding Claim, but where the polymer foam is embossed, in particular using a 'D-shaped' Pattern or inverse pyramid emboss or alternative design of emboss to artificially lower the compressive strength of the foam, thereby giving greater "softness".
9. An article as in any preceding Claim whereby a layer of air is trapped between the foil/metallised sheet material and the sheet material.
10. An article in any preceding Claim, but with a woven or non-woven substrate or scrim is laminated either to the opposing side or on top of the metallised surface to aid adhesion and to reduce creep or movement of the insulating underlay article or reduce creep or movement of the floor covering supported on the invention.
11. An article in any preceding Claim, but with a knitted substrate laminated either to the opposing side or on top of the metallised surface, to aid adhesion and to reduce creep or movement of the insulating underlay article or reduce creep or movement of the floor covering supported on the invention.
12. An article according to any preceding Claim wherein said sheet material has a thickness of less than 10mm.
13. An article according to any preceding Claim wherein said sheet material has a thickness that is greater than 0.5mm.

14. An article according to any preceding Claim wherein said sheet material has a thickness of between 4.5mm and 7.5mm.
15. An article according to any preceding Claim wherein said metallised polyester film or aluminium foil surface laminated to it is between 4 micron and 12 micron.
16. An article according to any preceding Claim wherein said metallised polyester film or aluminium foil surface laminated to it is in particular 6 micron.
17. An article according to any preceding Claim wherein said metallised polyester film or aluminium foil laminate is on either side of the said materials in any or all of the Claims numbered 1 to 5, so that the said material(s) is sandwiched between two reflective outer layers.
18. An article according to any preceding Claim, wherein the outer material has been chemically treated to have anti-fungal and anti-mildew properties.
19. An article according to any preceding Claim, which can be used as a thermal insulation medium or as a means of discharging electrostatic in rooms especially where computers are located.
20. An article according to any preceding Claim, which can be used as a thermal insulation medium to reflect radiant heat back into the room rather than allow it to dissipate into the floor under the flooring system, e.g. carpet or linoleum, or hard wood as well as provide insulation from conduction.
21. An article according to any preceding Claim, whereby the secondary layer laminated to the sheet material is of a reflective nature or designed to reflect radiation.

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Application No: GB 9906645.8
Claims searched: 1 to 21

Examiner: R.J.MIRAMS
Date of search: 8 September 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): B5N

Int Cl (Ed.7): A47G. B32B.

Other: ONLINE: WPI, EPODOC, JAPIO.

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	US5100725A	(Pearson) whole document	at least 1, 2, 6, 12 to 15, 20 and 21
X	EP0054780A1	(Werner) e.g. figures	at least 1, 2, 6, 7, 15, 20 and 21
X	WO90/14944A1	(ATD) e.g. page 7 lines 5 to 28	at least 1 to 3, 6, 10, 12, 13, 17 and 20
X	DE3339454A	(Polybrevets & Gestion) see abstract	at least 1 to 3, 6, 10, 17, 20 and 21
X	DE3124704A	(Feische) see abstract	at least 1, 6, 9,20 and 21

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.

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Application No: GB 9906645.8 **Examiner:** R.J.MIRAMS
Claims searched: 1 to 21 **Date of search:** 8 September 2000

Category	Identity of document and relevant passage		Relevant to claims
X	DE2026893A	(Hendrix) see abstract	at least 1 to 3, 6, 10, 19 and 20
X	JP070184761A	(Fukutani) see abstract	at least 1, 3, 6, 10, 18, 20 and 21

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.